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ABSTRACT

Outcomes of a follow-up, preventive care program based on a self-regulation model of neonate and parent behavior were studied in a controlled experiment. Subjects included a preterm control group, preterm intervention group, and full-term control group, with each group consisting of 27 infants. The assessment, which used the Brazelton Neonatal Behavioral Assessment Scale, focused on ways in which infants regulated behavior in the newborn period. At four weeks and at four months (corrected age), parents kept a diary for one week in which they recorded the times when the infant was asleep, awake and happy, or awake and miserable. During the newborn period of the self-regulation model, the task for the infant was to return to base or physiological stability. Parent responses indicated that the challenge for the infant was to achieve quiet states and that premature infants had more difficulty than full-term infants in achieving that goal. The intervention was designed to set appropriate limits that would enable the infant to achieve a still body for quiet sleep and calm awake time. Limits on motor interference and extraneous stimuli were set. Results indicated that by one month, premature infants in the intervention group slept at regular times, on average, 72 percent of the time. Parents worked with infants to achieve a rhythm of returning to base. Premature infants were able to effectively use awake time at four months, if the time was limited to 1.5 to 2.5 hours and sleep occurred regularly. (RH)

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INTERVENTION FOR UNSETTLED INFANTS

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INTRODUCTION

The first few months of life are difficult for almost all newborns and their parents. For the premature infant and his family the task is even more daunting (Minde 1984). Developmentalists refer to the infant's need to gain physiological stability (Sroufe 1979) while the parents are trying to establish a routine and regularity.

A clinical team of 2 psychologists and 2 physiotherapists developed a theoretical model of development to take into account the dual components of development which would be appropriate to both full-term and pre-term infants.

In the self regulation theory of development (Dolby, Warren, Meade and Heath 1987) physiological stability has been defined as returning to base. Returning to base has two components, the baseline posture of curled in flexion in which the baby's arms and legs are bent and the baby is still. The second aspect is baseline state where the infant is in good quality sleep or quiet alertness, his body is still except for an isolated startle, the breathing is regular and the face relaxed.

It has been found that premature infants return to a different base (Dolby et al 1987), the baseline posture of the premature infant is one of extension: and when he moves or is moved, he arches his back and neck and straightens his arms and legs. The baseline state is more fussy (Sammons & Lewis 1985) characterised by noisy, jumpy sleep and a diffuse awake state which quickly changes to an unavailable disorganised state, or a hyperalert state.

Within the self regulation model, the parents' task is to set limits, to provide a stimulus barrier for their infant (Sroufe 1979).

Parents of full term infants of one month describe their infant as more aware (64%) and more settled (44%). On the other hand parents of premature infants of 1 month describe their infants as more awake (control 96% intervention 68%) and stronger (premature control 54% intervention 32%) (See table I).

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TABLE I - DESCRIPTION OF BABY AT 1 MONTH

	PREM CONTROL	PREM INTERVENTION	TERM CONTROL
more awake and aware	96% alert	68% aware	64% aware
more active or stronger	54%	32%	12%
more settled	8%	20%	44%

Today I would like to report on the outcome of the initial intervention of a follow up, preventative care programme based on the self-regulation model of behaviour. A theoretical model based on self-regulation rather than milestones was chosen because the premature infant's difficulties appear to lie in the control or regulation of behaviour rather than in delay.

The programme was designed to fit into any hospital follow up service over the first 12 months.

The preventative care which flowed on from assessment of the infant and the parents expressed difficulties, was implemented through day to day handling of the infant for which parents took responsibility.

Method

Subjects: There were three groups of infants -

* a preterm control group (N=27)
* a preterm intervention group (N=27)
* a full term control group (N=27)

The premature infants were born at least 7 weeks early and were not growth retarded.

The full term infants were born at 38-40 weeks, vertex presentation and vaginal delivery, with apgars of 8 & 9 at 1 & 5 minutes.

The parents gave their written informed consent.

The preterm intervention and control groups were run in four blocks (control - intervention - control - intervention). This method of assignment ensured that at any one point in time, mothers in the Neonatal Unit had the same experience of either:

1. Having their infants regularly assessed (preterm control group) - or

2. Participating in a programme based on these assessments (preterm intervention group)

Full term infants were enrolled into the project over the period that preterm infants were enrolled.

Assessments:

How the infant was regulating behaviour in the newborn period was assessed using the Brazelton Neonatal Behavioural Assessment Scale. At 4 weeks and 4 months (corrected age) parents were asked to complete a diary for 1 week which recorded the times when the infant was asleep, awake and happy, or awake and miserable.

Intervention:

During the newborn period of the self-regulation model the task for the infant is to return to base. At one month, in reply to the question "what is the most difficult thing about your infant?', parents of both full-term (39%) and preterm (42%) infants gave irritability as the most common difficulty. However, when irritability was broken down into either chronic or task specific irritability, parents of full-term infants were speaking of irritability associated with a specific task, e.g bathtime, or not being able to wait for a feed. Parents of premature infants on the other hand spoke of irritability being over an extended period of time, e.g from one feed to the next, and for which they could not give an explanation. In addition significantly fewer parents of premature infants said 'nothing' was difficult. (see table 2).

TABLE 2 - DIFFICULTIES MENTIONED BY PARENTS AT ONE MONTH

	IRRITABLE	WON'T GO TO SLEEP	NOTHING	DELAY
Responses (26)				
Term 39% (11) N = 25		18% (5) significant	36% (10)	-
Responses (60)				
Prem 42% (28) N = 51		25% (17)	13% (9)	9% (6)

CHRONIC IRRITABILITY

TERM 0 Prem 23	Long term - from one feed to the next

TASK SPECIFIC IRRITABILTY

Term 11 Prem 5	parents specified what it was related to and what to do about it

The information gained from the parents responses confirmed that the challenge for the infant was to achieve quiet states and that premature infants were having more difficulty achieving their goal. Thus the principles of the intervention were to set appropriate limits for the infant to achieve a still body for quiet sleep and calm awake time.

Limits on Motor Interference

* Using the Brazelton Neonatal Assessment we demonstrated the difficulty for the infant in keeping his body still and either getting back to sleep or being able to pay attention, and the effort he was putting in to do so. It was a natural progression to then demonstrate how the infant could achieve a quiet state by being given some support or being curled in.

* Parents were taught how to wrap their infants to contain them. Initially they were encouraged to keep them wrapped in the flexed position not only for sleep but for each period the infant was quietly awake to allow the infant to concentrate on sensory stimulation.

* Parents were shown how to carry the infant by tucking him into the crook of the elbow in the 'tuck arm' position from where the infant could be still and either sleep, or look out at the world.

Limits on extraneous stimuli

* The notion of the infant having two birthdays was introduced, the one when the infant was born, which is the one which would be celebrated and the one when the infant should have been born which would be the one to follow to monitor the infant's development.

* We discussed the infant's need for quiet sleep and how much sleep, (16-18 hours in 24). Initially, the infant was trying to achieve a rhythm of deep and light sleep interspersed with feeding, and a brief period of alertness and activity, around each feed. Toward the end of the first month, when getting to sleep was often more difficult, (note the parent's observations at one month, 'more alert' and 'stronger'), we encouraged parents to put their efforts into getting the infant to sleep rather than trying to amuse the infant. If the infant was not happily awake then it could be assumed he would prefer to be asleep and was having difficulty getting there and staying asleep.

  An infant will modulate alertness once he has achieved good quality sleep and can reliably return to sleep. Parents efforts were directed toward recognising the first indications of the infant no longer wanting to be awake (often increased activity), to come in then and, contain the infant by wrapping and holding to ensure curled in posture and a still body, and staying with the infant until quiet sleep was established i.e. by rocking or patting rhythmically.

Results:

From the diaries completed by parents at 1 and 4 months the amount of sleep the infant had in 24 hours together with the regularity of sleep over a week were noted.

At one month thee was no difference between the three groups in the amount of sleep, however, there was a significant difference between the intervention group and both control groups with the intervention group being more regular in their sleep ($t = 2.457$, $p = < .01$, comparison between premi control versus premi intervention $t = 2.605$, $p = <.01$ comparison between premi intervention and full term control).

TABLE 3 - MEAN PERCENTAGE OF REGULARITY OF SLEEP AT 1 MONTH

GROUP	N	MEAN	SD
1. premature control	20	60.200	15.609
2. premature intervention	21	72.095	13.939
3. full-term control	19	59.316	16.149
Tests between group means:			
Group 1 premature control) Group 2 premature intervention)		t = 2.457 p = .018	
Group 2 premature intervention) Group 3 full-term control)		t = 2.605 p = .013	

i.e Infant is asleep for 30 minutes in the same hour 5 days in the 7

At 4 months once again there was no difference between the three groups on the amount of sleep and a significant difference on regularity of sleep. Once again the premature intervention group had more regular sleep over the week than either the full-term or premature control groups.

TABLE 4 - MEAN PERCENTAGE OF REGULARITY OF SLEEP AT 4 MONTH

GROUP	N	MEAN	SD
1. premature control	20	56.100	14.011
2. premature intervention	18	64.444	10.821
3. full-term control	21	51.476	10.856
Tests between group means:			
Group 1 premature control) Group 2 premature intervention)		t = 2.077 p = .042	
Group 2 premature intervention) Group 3 Full-term control)		t = 3.266 p = 0.003	

i.e Infant is asleep for 30 minutes in the same hour 5 days in the 7

Discussion and Conclusion:

The results indicate that by 1 month of age the premature intervention group were sleeping at regular times on average 72% of the time. PArents were working with their infants to achieve a rhythm of returning to base.

By contrast the full term group were the least regular. Full term infants on average, did not need the same regularity of sleep to maintain happy awake periods, they could have a long stretch of awake time and predictably go to sleep at the end of it without difficulty. Premature infants on the other hand were able to use their awake time more effectively at 4 months, if it was limited to 1.5 - 2.5 hours and sleep occurred regularly. As one mother of a very early premature infant stated 'she has to recuperate from the 4 months of hospitalisation, I can't expect her to cope with a noisy household. She has to have all the sleep she can get'.

As stated previously, at one month parents said their infants were more awake. However, the full term parents and the parents of the preterm intervention group were more likely to talk of their infant being 'aware', whereas almost all of the premature control parents used the word 'alert' with its connotation of a more fixed wide-eyed infant.

It is important to remember that a more regular baby means parents have a sense of accomplishment in what they have achieved. Knowing they can succesfully put limits on their infant and bring him back to base means they can confidently allow their infant to move on to the next developmental challenge of taking the initiative.

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ABSTRACT

Intervention for unsettled infants

In a follow-up study of both premature and full-term infants, difficulty in settling the infant and/or irritable behaviour was mentioned by all mothers as the primary concern of the newborn period. However, mothers of premature infants were twice as likely to cite this as their main worry (59% versus 23%). According to self-regulation theory, babies become settled once they can reliably return to base. This means returning to baseline posture in which the baby is still and to baseline state where the infant achieves solid sleep or alertness. Using assessments of self-regulation, premature infants were observed to have greater difficulty returning to base than their full-term counterparts. However, the assessments also indicated that the infants could achieve the true baseline when their early signs of tiredness were responded to, the baby's own efforts to self-quiet were built upon, and help was sustained until the infant reached base. In half the sample of premature infants (N=27) these ideas on limit setting were discussed and tried by mothers. Diaries kept by mothers at 1 and 4 months showed infants in the intervention group as achieving significantly more regular sleep at both time periods than controls (either pre-term or full-term). The value of "setting limits" as a first parenting task is discussed.